

CLAIMS

- 5 1. A process for the bacterial oxidation of sulphide ores and concentrates characterised in that the ore or concentrate is leached with a mixed bacterial culture at a temperature of between about 40 to 65°C, and at a pH of between about 0.8 to 2.2.
2. A process according to claim 1, characterised in that the ore or concentrate is leached with the mixed bacterial culture in a heap leach, tank leach, vat leach or dump leach.
- 10 3. A process according to claim 1 or 2, characterised in that the ore or concentrate is either of a base metal, a precious metal or platinum group ore or concentrate.
- 15 4. A process according to any one of claims 1 to 3, characterised in that the sulphide ore or concentrate contains chalcopyrite.
5. A process according to any one of the preceding claims, characterised in that the leach takes place in the temperature range of about 45 to 60°C.
6. A process according to any one of the preceding claims, characterised in that the ore or concentrate is leached at a grind or crush size of up to and greater than P<sub>80</sub> 90 µm.
- 20 7. A process according to claim 6, characterised in that the grind or crush size is between about P<sub>80</sub> 75 µm and P<sub>80</sub> 90 µm.
- 25 8. A process according to any one of the preceding claims, characterised in that the mixed bacterial culture comprises one or more of *Sulfobacillus thermosulfidooxidans*, *Thiobacillus caldus*, and *Thermobacillus ferrooxidans*.
9. A process according to any one of the preceding claims, characterised in that the leach is carried out over a period of between 8 to 36 days.

10. A process according to any one of the preceding claims, characterised in that the mixed bacterial culture is first adapted to the particular ore or concentrate.
11. A process according to claim 10, characterised in that the process of adaption comprises the addition of both a sample of the ore or concentrate and the mixed bacterial culture to a leach vessel, and leaching the resulting slurry until the level of targeted metal reporting to solution either reaches 100% or reaches a plateau.
12. A process according to claim 11, characterised in that the adaption slurry is pH adjusted to a pH of between about 1.6 and 1.8.
13. A mixed bacterial culture for use in the bacterial oxidation of sulphide ores and concentrates, characterised in that the mixed bacterial culture is able to oxidise the ores and concentrates at leach temperatures of between about 45 to 65°C, and at a pH of between about 0.8 to 2.2.
14. A mixed bacterial culture according to claim 13, characterised in that the culture comprises one or more of *Sulfobacillus thermosulfidooxidans*, *Thiobacillus caldus*, and *Thermobacillus ferrooxidans*.
15. A mixed bacterial culture according to claim 13 or 14, characterised in that the mixed bacterial culture is able to oxidise chalcopyrite mineral ores and concentrates at grind or crush sizes up to and greater than P<sub>80</sub> 90 µm.
16. A mixed bacterial culture according to claim 15, characterised in that the grind or crush size is between about P<sub>80</sub> 75 µm and P<sub>80</sub> 90 µm.
17. A mixed bacterial culture according to any one of claims 13 to 16, characterised in that the leach is carried out over a period of between 8 to 36 days.